



REFLECTION[◇] Constrained Liner

Introduction

“Surgical treatment of recurrent dislocation should be directed toward correction of any mechanical abnormalities. If dislocation is caused by impingement, then correction of malpositioned components, use of a larger head to improve the head/neck ratio, and removal of prominent ectopic bone should improve stability. If instability is resulting from soft tissue laxity, then modular femoral neck lengthening or trochanteric advancement is appropriate to increase muscle tension. However, trochanteric advancement may not be feasible if proximal femoral bone stock is poor. Use of a constrained cup is also appropriate for management of dislocation associated with soft tissue laxity or abductor dysfunction and avoids the potential complications of trochanteric non union which may occur following trochanteric advancement. However, failures of constrained liners have been reported. Increased implant constraint is associated with greater stress at the bone-implant interface, which can lead to mechanical failure from cyclic loading. Repeated, or very forceful impingement of the prosthetic neck on the liner may also lead to failure of the device. Proper implant position to avoid impingement and stable fixation of a constrained acetabular cup should be achieved to minimize the risk of mechanical failure.”

- Dr. Michael Ries

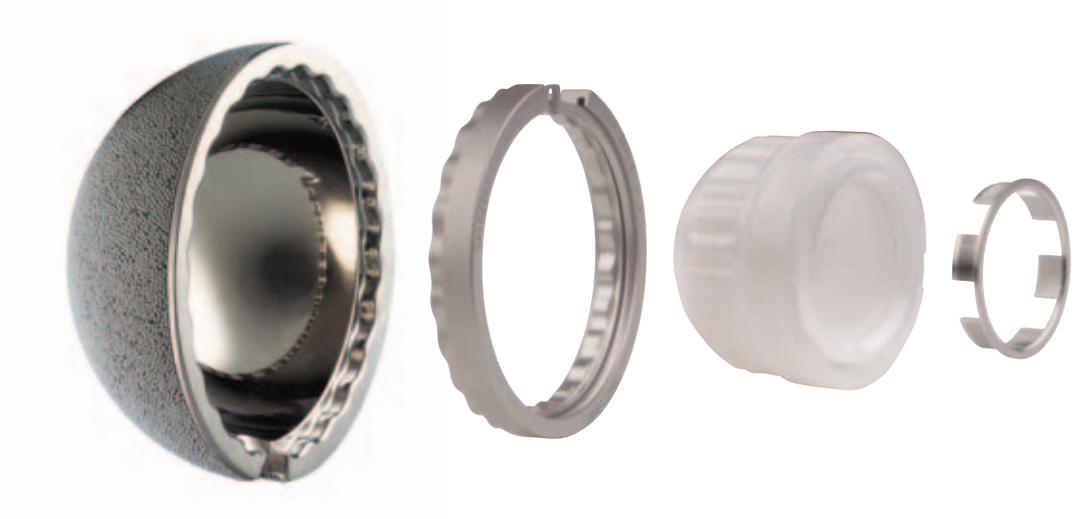
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Nota Bene: The technique description herein is made available to the healthcare professional to illustrate the authors' suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

Product Overview

The REFLECTION[®] MICROSTABLE[®] liner locking mechanism is a robust design that allows easy liner insertion and removal, and outstanding liner/shell stability. With the addition of an adaptor ring, the REFLECTION shell provides the pull-out strength necessary for constrained liner applications.

The adaptor ring is a three-piece construct packaged assembled on a Y-shaped holder that helps align the rings when being impacted into the shell.

The constrained liner is made of conventional, non-irradiated UHMWPE to retain the polyethylene material properties. The liner provides 4mm of lateralization.

The design of constrained liners involves a trade-off between head lever-out resistance and range of motion (ROM). Typically, the higher the lever-out resistance, the smaller the ROM the device can achieve. The REFLECTION constrained liner is optimized to balance range of motion requirements with increased resistance to head lever-out.

The REFLECTION constrained liner has a head lever-out resistance of at least 270 inch-pounds for a 28mm head which is approximately 80% greater than a competitive constrained device with multiple cases of re-dislocation reported in the literature and comparable to the smaller size competitive tripolar constrained liners which have few reported re-dislocations. The adaptor/liner assembly resists liner lever-out to levels of over 1300 inch-pounds. This is higher than all measurable lever-out loads of standard liners reported by Greenwald, et al, in the AAOS 1996 scientific exhibit.

Combined with the Smith & Nephew circulo-trapezoidal neck, up to 87° of motion can be achieved with a 28mm head. This exceeds reported measurements with a commonly used competitive tripolar design.

Use of a constrained liner in combination with a skirted head is not recommended. Skirted heads may reduce prosthetic ROM to clinically unacceptable levels.



Constrained Liner ROM

Head diameter (mm)	Shell OD			
	46-48	50-52	54-60	62-76
22	73°			
26		79°		
28			87°	87°
32				96°

Surgical Technique

Step 1

Insert the appropriately sized Constrained Liner Adaptor Ring into the REFLECTION[®] shell. The adaptor should be placed into the liner lock mechanism. A "click" should be felt or heard when the adaptor is pressed into the shell. For ease of insertion and visual check, place the open end of the adaptor rings over the removal slot on the shell or where best visibility of opening is possible.



Tips

#1. If exposure is adequate, then the alignment rod can be secured into the apex hole first. This can act as a guide to ensure proper seating of adaptor ring.

#2. The constrained liner impactor can also be used to ensure seating of the adaptor ring. Choose the impactor that is 2 sizes larger than the shell (62/64 impactor for a 54/56 shell) and place the feet of the impactor directly on the adaptor ring, then tap to set the ring.

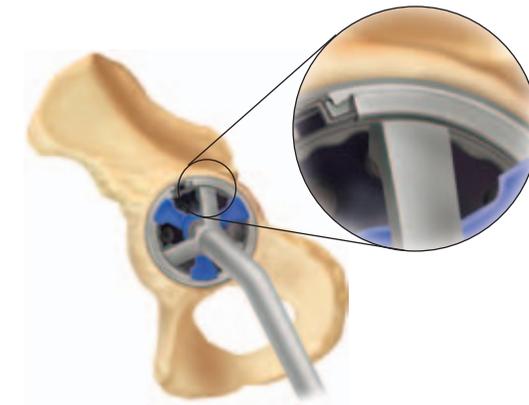
Step 2

Insert the Alignment rod through the center of the adaptor and screw into the apex hole in the shell. This may be performed by hand or using any of the standard REFLECTION 3.5mm hex screwdrivers.



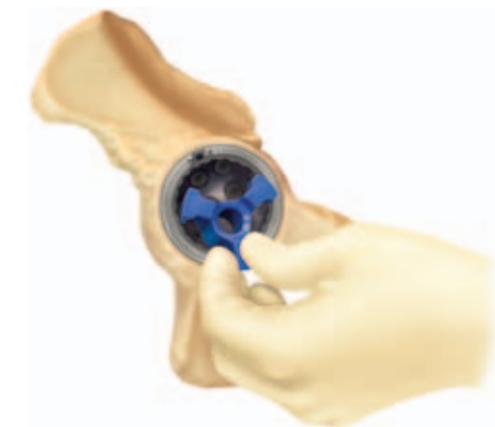
Step 3

Select the respectively sized impactor and slide it over the end of the alignment rod. Place the legs of the impactor between the arms of the plastic holder of the adaptor (see picture). Use a mallet to strike the platform on the impactor. When impacted sufficiently, the adaptor device will be locked into the shell. When the ring is locked in place, the plastic holder is loose, and can be easily pulled from the adaptor rings. If the plastic adaptor is not loose, strike the impactor again and repeat check.



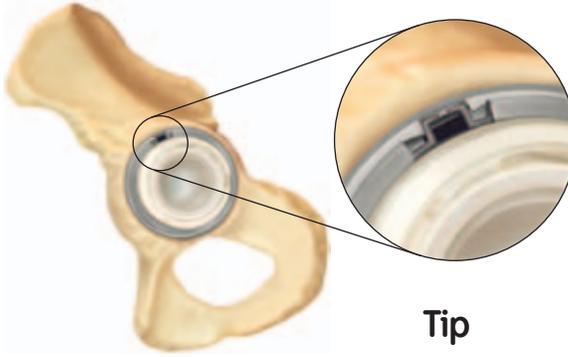
Step 4

Remove the plastic holder. This piece is disposable. At this point, the apex hole cover may be inserted into the shell.



Step 5

Insert the liner into the shell. Rotating the liner may be necessary to match up the anti-rotation splines of the liner with the inner adaptor ring. When the liner has been pushed as far as possible into the shell by hand, use the liner impactor tool to seat completely. After liner is assembled, a space will be visible between the prongs as seen in the illustration above.



Tip

#1. To ease the extraction of the impactor, use an impactor head one size smaller than the implant head size (i.e., use a 26 mm impactor head for a 28 mm constrained liner).

Step 6

Place the retainer ring over the head of the femoral implant with the "tabs" facing away from the femur. Reduce the femoral implant head into the opening of the acetabular liner. Rotate the femur to check mobility of the head in the liner. After the head is in the liner, position the retainer ring tabs into the mating slots on the liner face. To find the slots, place the tabs onto the groove in the face and rotate the ring until they drop in the slots.



Step 7

Once all tabs are started into the slots, push the retainer ring down until the tabs are seated fully. To seat all the way, the use of the horseshoe shaped retainer impactor may be desired. Place the retainer impactor around the neck of the femoral component and push on the retainer ring, using a mallet if needed. Use of other tools to push the impactor ring could cause damage, which could lead to ring fracture.



Catalog Information

Constrained Liner Instruments

Cat. No.	Description
71363140	Constrained Liner Alignment Rod
71363141	Constrained Liner Retaining Ring Pusher
71362802	Constrained Liner Lock Ring Retractor
71363143	Constrained Liner Impactor 46-48
71363144	Constrained Liner Impactor 50-52
71363145	Constrained Liner Impactor 54-56
71363146	Constrained Liner Impactor 58-60
71363147	Constrained Liner Impactor 62-64
71363148	Constrained Liner Impactor 66-68
71363149	Constrained Liner Impactor 70-76
71363151	Constrained Liner Instrument Tray



REFLECTION® Constrained 0 Degree Liner and Retaining Ring

Cat. No.	ID (mm)	Cup Size (mm)
71323103	22	46-48
71323114	26	50-52
71323125	28	54-56
71323126	28	58-60
71323127	28	62-64
71323128	28	66-68
71323129	28	70-76
71323137	32	62-64
71323138	32	66-68
71323139	32	70-76



Constrained Liner Impactor

Cat. No.	Cup Size (mm)
71363143	46-48
71363144	50-52
71363145	54-56
71363146	58-60
71363147	62-64
71363148	66-68
71363149	70-76



Constrained Liner Adaptor

Cat. No.	Cup Size (mm)
71323143	46-48
71323144	50-52
71323145	54-56
71323146	58-60
71323147	62-64
71323148	66-68
71323149	70-76



Constrained Liner Retaining Ring Pusher

Cat. No. 71363141



Constrained Liner Alignment Rod

Cat. No. 71363140

Constrained Liner Lock Ring Retractor

Cat. No. 71362802

Constrained Liner Instrument Tray

Cat. No. 71363151

Orthopaedics

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